1139-37-481 **Munther Dahleh*** (dahleh@mit.edu). *Learning for control: the role of model approximation.*

Robust control theory highlighted the importance of quantifying model uncertainty for the design of feedback control strategies that achieve a provable level of performance. The robustness paradigm motivated work on 'robust learning' to address the question of how well model uncertainty can be characterized from data. The quality and convergence rate of model approximation from data imposes a fundamental limit on the rate of adaptation of the underlying control/decision strategy. In particular, for some model classes, sample complexity results impose significant limitations on such adaptation rates.

The characterization of the relationship between learning and model uncertainty hinges on having a tractable theory for model approximation. While this is available in the case of LTI systems, such theory is lacking for more general stochastic models. In this talk, I will present some partial results for learning classes of stochastic systems, namely, jump linear systems and Hidden Markov Models. A key question for such models is the unraveling of the underlying model structure from data. I will discuss how spectral methods can be used for this purpose.

This work is in collaboration with Tuhin Sarkar and Mardavij Roozbehani. (Received February 19, 2018)